CLAIMS

1. A method for generating insulin-secreting cells from precursor stem cells, said method comprising exposing said precursor cells to a nucleic acid molecule encoding neurogenin3 (ngn3) under conditions effective to generate said insulin-secreting cells from said precursor cells.

2. The method of claim 1, wherein the precursor cells are embryonic stem cells.

3. The method of claim 1, wherein said precursor cells are exposed in vitro to said nucleic acid molecule encoding ngn3.

4. A method for generating insulin-secreting cells from precursor stem cells, said method comprising exposing said precursor cells to an activator of ngn3 gene expression under conditions effective to generate said insulin-secreting cells from said precursor cells.

5. The method of claim 4, wherein said precursor cells are embryonic stem cells.

6. The method of claim 4, wherein said precursor cells are exposed in vitro to said activator of ngn3 gene expression.

7. A method for generating insulin-secreting cells from precursor stem cells, said method comprising exposing said precursor cells to a nucleic acid molecule encoding NeuroD/ß2 under conditions effective to generate said insulin-secreting cells from said precursor cells.

8. The method of claim 7, wherein said precursor cells are embryonic stem cells.

9. The method of claim 7, wherein said precursor cells are exposed in vitro to said nucleic acid molecule encoding NeuroD/ß2.

10. A method for generating insulin-secreting cells from precursor stem cells, said method comprising exposing said precursor cells to an activator of NeuroD/ß2 gene expression under conditions effective to generate said insulin-secreting cells from said precursor cells.

11. The method of claim 10, wherein said precursor cells are embryonic stem cells.

12. The method of claim 10, wherein said precursor cells are exposed in vitro to said activator of NeuroD/ß2 gene expression.

13. A method for generating insulin-secreting cells from adult pancreatic exocrine cells, said method comprising exposing said exocrine cells to a nucleic acid molecule encoding ngn3 under conditions effective to generate said insulin-secreting cells from said exocrine cells.

14. The method of claim 13, wherein said exocrine cells are pancreatic duct cells.

15. The method of claim 14, wherein said duct cells are human cells.

16. The method of claim 13, wherein said exocrine cells are exposed in vitro to said nucleic acid molecule encoding ngn3.

17. A method for generating insulin-secreting cells from adult pancreatic exocrine cells, said method comprising exposing said exocrine cells to an activator of ngn3 gene expression under conditions effective to generate said insulin-secreting cells from said exocrine cells.

18. The method of claim 17, wherein said exocrine cells are pancreatic duct cells.

19. The method of claim 18, wherein said duct cells are human cells.

20. The method of claim 17, wherein said exocrine cells are exposed in vitro to said activator of ngn3 gene expression.

21. A method for generating insulin-secreting cells from adult pancreatic exocrine cells, said method comprising exposing said exocrine cells to a nucleic acid molecule encoding NeuroD/ß2 under conditions effective to generate said insulin-secreting cells from said exocrine cells

22. The method of claim 21, wherein said exocrine cells are pancreatic duct cells.

23. The method of claim 22, wherein said duct cells are human cells.

24. The method of claim 21, wherein said exocrine cells are exposed in vitro to said nucleic acid molecule encoding NeuroD/ß2.

25. A method for generating insulin-secreting cells from adult pancreatic exocrine cells, said method comprising exposing said exocrine cells to an activator of NeuroD/ß2 gene expression under conditions effective to generate said insulin-secreting cells from said exocrine cells.

26. The method of claim 25, wherein said exocrine cells are pancreatic duct cells.

27. The method of claim 26, wherein said duct cells are human cells.

28. The method of claim 25, wherein said exocrine cells are exposed in vitro to said activator of NeuroD/ß2 gene expression.

29. An insulin-secreting cell produced by the method of claim 1.

30. An insulin-secreting cell produced by the method of claim 4.

31. An insulin-secreting cell produced by the method of claim 7.

32. An insulin-secreting cell produced by the method of claim 10.

33. An insulin-secreting cell produced by the method of claim 13.

34. An insulin-secreting cell produced by the method of claim 17.

35. An insulin-secreting cell produced by the method of claim 21.

36. An insulin-secreting cell produced by the method of claim 25.

37. A method for identifying whether a compound is an activator of ngn3 gene expression, said method comprising: (a) exposing progenitor stem cells or adult pancreatic exocrine cells to said compound <u>in vitro</u> and (b) measuring the generation of insulin-secreting cells from said exposed progenitor cells or adult pancreatic exocrine cells, where the generation of insulin-secreting cells from said exposed progenitor cells or adult pancreatic exocrine cells indicates that said compound is an activator of ngn3 gene expression.

38. A method for identifying whether a compound is an activator of NeuroD/ß2 gene expression, said method comprising: (a) exposing progenitor stem cells or adult pancreatic exocrine cells to said compound <u>in vitro</u> and (b) measuring the generation of insulin-secreting cells from said exposed progenitor cells or adult pancreatic exocrine cells, where the generation of insulin-secreting cells from said exposed progenitor cells or adult pancreatic exocrine cells indicates that said compound is an activator of NeuroD/ß2 gene expression.

39. A method for generating insulin-secreting cells from precursor stem cells or adult pancreatic exocrine cells, said method comprising exposing said cells to a compound identified by the method of claim 37 in an amount effective to generate said insulin-secreting cells.

40. A method for generating insulin-secreting cells from precursor stem cells or adult pancreatic exocrine cells, said method comprising exposing said cells to a compound identified by the method of claim 38 in an amount effective to generate said insulin-secreting cells.

41. An isolated insulin-secreting cell, wherein said cell is characterized by the absence of RNA transcripts for glucose transporter type 2 protein and by the presence of RNA transcripts for synaptophasin, chromogranin A, prohormone convertase PC1/3, and glucokinase.